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REVISED
SAMPLING AND ANALYSIS PLAN FOR
305 SPICER AVENUE
SOUTH PLAINFIELD, NEW JERSEY

Prepared for

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1.0 INTRODUCTION

1.1 Background

305 Spicer Avenue (the Site) is a residential property of approximately 10,000 square feet located on the north side of Spicer Avenue in South Plainfield Township, Middlesex Coimty, New Jersey. The Site is adjacent to the Hamilton Industrial Park, where earlier soil sampling has indicated the presence of PCBs. Soil samples collected by USEPA from the Site and other residences surrounding the Hamilton Industrial Park were also found to contain PCBs. ENVIRON has been retained by Cornell Dubilier Electronics, Inc. (CDE), to assist with additional soil sampling at the Site as required in partial fulfilhnent of the administrative order of consent (AOC, Index Number II-CERCLA-98-0115) between CDE, D.S.C. of Newark Enterprises, Inc. and USEPA.

1.2 Purpose

In October 1997, USEPA collected surface soil samples (0 to 2 iiiches in depth including gravel cover) from 24 locations at the Site. Subsequent to this sampling, ENVIRON collected deeper soil samples from 2 soil borings located adjacent to the two locations sampled by USEPA which exhibited the highest PCB concentrations.

The purpose of this planned sampling program is to delineate the vertical and horizontal extent of PCB concentrations in soil above 1 mg/kg. Data from these soil samples and previously collected data will be analyzed to determine the extent of soil removal required such that the 95% upper confidence limit (UCL) of the arithmetic mean PCB concentration in surface soils in the portion of the property not excavated does not exceed 1 mg/kg. The data analysis and definition of the scope of soil removal necessary to meet this cleanup objective will be presented in a Work Plan for soil removal to be submitted to USEPA pursuant to the AOC.

2.0 PROPOSED SAMPLE COLLECTION

2.1 Soil Sample Locations

Surface soil samples will be collected at depth intervals of 0 to 6 inches from locations selected using the 20-foot by 20-foot grid pattern utilized by USEPA during its site characterization activities conducted in October 1997. The gravel layer covering the soil will be removed prior to sampling. A total of twenty-two (22) shallow surface samples will be collected during this sampling event.

In addition to the surface soil sampling, deeper soil samples will be collected from soil borings in order to complete the vertical delineation necessary to define the scope of soil removal. Two borings will be advanced at two surface soil sample locations not previously sampled at depth. Two borings will be advanced at locations previously sampled at depth to complete the vertical profile of PCB concentrations.

A summary of the sample media, locations, and analytes is provided in Table 2-1. Sampling locations are illustrated in Figure 2-1.

2.2 Laboratory Analytical Methods

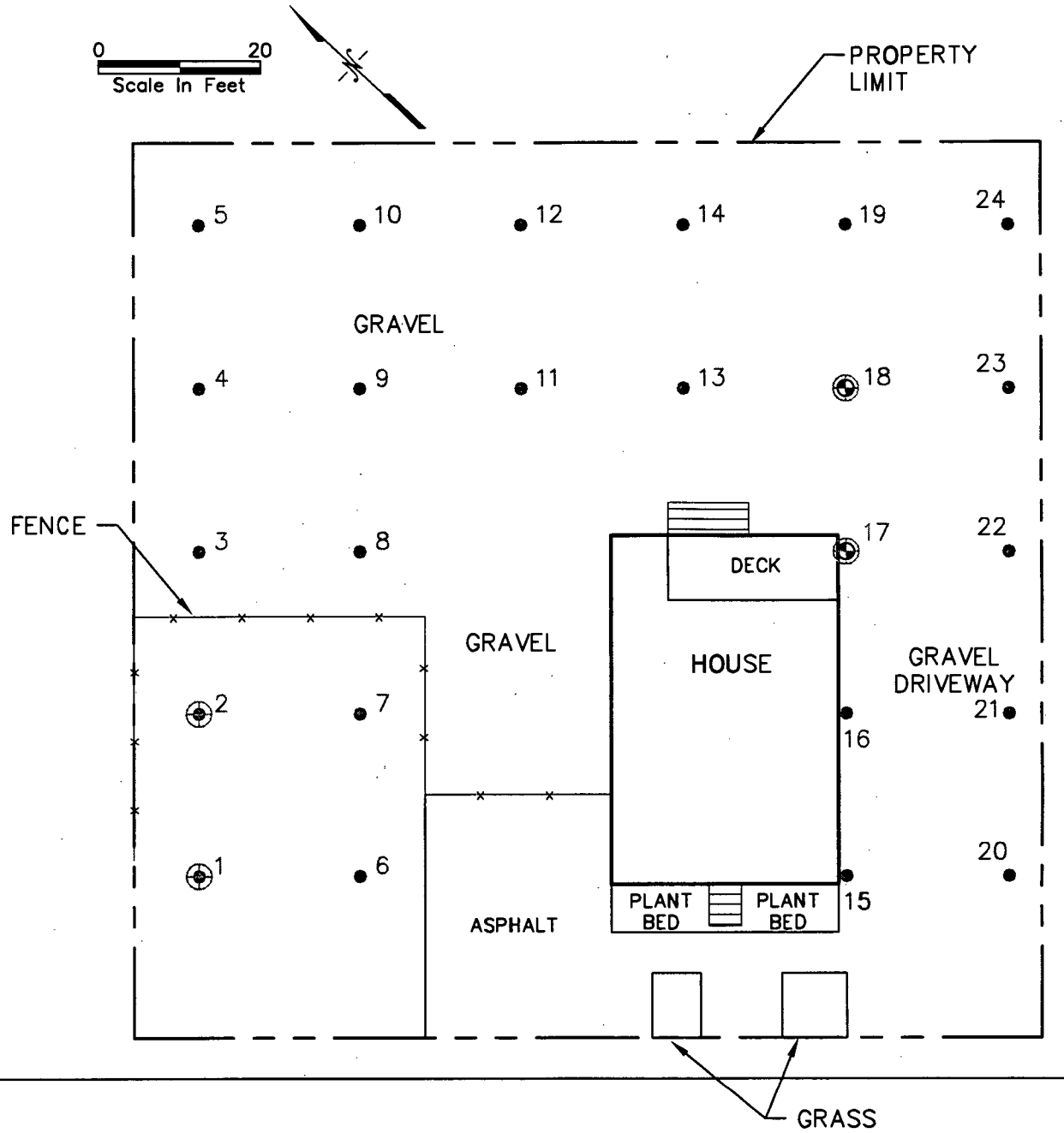
Soil samples will be analyzed for PCBs. All analyses for PCBs will comply with the analytical procedures presented in USEPA's *Test Methods for Evaluating Solid Waste (Physical/Chemical Methods)*, SW-846, Third Edition, September 1986. Method 8082 (Revision 0, December 1996) will be used for PCB analyses. See Table 2-2 for sample preservation, containers and holding times for the specified analyses.

2.3 Field Procedures

This section describes the general approach for implementing field sampling activities; standard sampling procedures are detailed in Appendix A.

2.3.1 Shallow Surface Soil Sampling

Shallow surface soil samples will be collected from 0 to 6 inches below any gravel cover using a clean hand trowel or hand auger. The trowel or auger will be decontaminated between each sample, following the procedures described in Section 2.3.3 below.



LEGEND

- ● SURFACE SOIL SAMPLING LOCATION
- ⊕ SOIL BORING LOCATION
- ◒ SOIL BORING (COMPLETED 4/98)

ENVIRON

DRAFTED BY: RT/KPM | DATE: 8/18/98

PROPOSED SOIL SAMPLE LOCATIONS AT PROPERTY I
305 SPICER AVE.; HAMILTON INDUSTRIAL PARK
SOUTH PLAINFIELD, NEW JERSEY

FIGURE 2-1

5840AS3G

TABLE 2-1
Summary of Proposed Samples, Locations and Analytes
305 Spicer Avenue

Media	Number and Location	Analytes	Sample IDs
Surface Soils	20 surface soil samples: Soil grid at 20 foot intervals under surface gravel. (Note that two additional surface soil samples are associated with the soil borings listed below)	Polychlorinated Biphenyls (PCBs)	CDI03-DS-01 CDI04-DS-01 CDI05-DS-01 CDI06-DS-01 CDI07-DS-01 CDI08-DS-01 CDI09-DS-01 CDI10-DS-01 CDI11-DS-01 CDI12-DS-01 CDI13-DS-01 CDI14-DS-01 CDI15-DS-01 CDI16-DS-01 CDI19-DS-01 CDI20-DS-01 CDI21-DS-01 CDI22-DS-01 CDI23-DS-01 CDI24-DS-01
Soil Borings	2 Soil Borings: Samples collected under the surface gravel at 6-inch intervals to a depth of 2 feet.	Polychlorinated Biphenyls (PCBs)	CDI01-DS-01 CDI01-DS-02 CDI01-DS-03 CDI01-DS-04 CDI02-DS-01 CDI02-DS-02 CDI02-DS-03 CDI02-DS-04
	2 Soil Borings: Samples collected at 6-inch intervals between 24" and 36" below gravel surface cover.	Polychlorinated Biphenyls (PCBs)	CDI17-DS-05 CDI17-DS-06 CDI18-DS-05 CDI18-DS-06

TABLE 2-2
Sample Preservation, Containers and Holding Times for Specified Analyses[1]

Laboratory Analysis	Analytical Method	Matrix	Preservative[2]	Container	Analytical Hold Time
Polychlorinated Biphenyls (PCBs)	SW-846 8082	sediment or soil	none	8 oz. sample jar	14 days
Polychlorinated Biphenyls (PCBs)	SW-846 8082	water	none	1 L amber glass bottle	7 days

Note:

(1) Analyses are specified in site-specific Work Plan.

(2) All samples must be cooled to 4°C; additional preservatives are noted.

2.3.2 Deep Surface Soil Sampling

Soil samples will be collected to a depth of two feet using a clean hand auger. The gravel layer will be removed and soils will be collected at intervals of 0 to 6 inches, 6 to 12 inches, 12 to 18 inches and 18 to 24 inches for each sample. The hand auger will be decontaminated between each interval, following the procedures described in Section 2.3.3 below.

A sequential analysis will be conducted on the depth interval samples. The 0-to-6-inch and 12-to-18-inch interval samples will be submitted for PCB analysis. If the 12-to-18-inch interval sampling results exceed 1 ppm, the 18 to 24 inch interval sample will be submitted for PCB analysis.

2.3.3 Equipment Decontamination Procedures

All sampling equipment will be decontaminated prior to use and will arrive on-site in clean condition. All sampling equipment will also be decontaminated between each use using the following or equivalent procedure:

- Place dirty equipment on plastic ground sheet or in similar containment area;
- Wash thoroughly with a laboratory detergent (Alconox or equivalent) to remove any particulate matter and/or surface films using bristle brush, as needed (sampling equipment with oil or other hard to remove materials may require rinsing with isopropanol prior to washing with the detergent solution);
- Rinse thoroughly with clean potable water;
- Rinse thoroughly with clean deionized water;
- Air-dry; and
- Wrap decontaminated equipment in aluminum foil (shiny side out) for storage and transportation.

Prior to implementing decontamination activities, a location within the sampling area will be designated for these activities. Wash water will be allowed to evaporate or infiltrate into the ground. Used PPE will be collected for disposal as nonhazardous industrial waste.

2.3.4 Sample Management

ENVIRON sample management procedures are described in detail in Appendix A and are summarized below. These procedures are equivalent to those provided in *NEIC Policies and Procedures*, May 1978 [Revised August 1991].

ENVIRON personnel will keep a bound field notebook recording all activities at the site, including sample collection and tracking information. All samples submitted for analysis under this plan will be collected and shipped by ENVIRON personnel. A unique sample code will be assigned to each sample collected. This code will consist of different parts to identify the site, sample media, sample location, and the sample type (i.e., environmental, duplicate sample, field blank, etc.). Sample types and location designations in the sample code will be such that they will be compatible with the site and overall project data base system. The codes and their representation are defined in Appendix A; the sample designations for this project are listed on Table 2-1.

All sampling containers and preservatives will be provided by a designated laboratory. Samples will be stored in coolers until they can be shipped to the laboratory. Samples will be transported from the field to the designated laboratory using an overnight carrier service. All sample containers will be shipped with chain-of-custody records. A separate chain-of-custody will accompany each cooler. These chain-of-custody records will be completed by the field sampling personnel and returned with the samples. All samples shipped to the designated laboratory will be packaged and shipped as excluded materials (as defined in 40 CFR Part 261.4). Sample packaging procedures will comply with all U.S. Department of Transportation (DOT) requirements and International Air Transport Association (IATA) standards, as detailed in the most current edition of the IATA *Dangerous Goods Regulations* for hazardous materials shipment.

Upon sample receipt at the designated laboratory, all sample collection dates are to be noted by the sample custodian. The required date for completion of analysis (or extraction) will be noted and keyed to the holding time. A Laboratory Project Manager will have been assigned and will be responsible for ensuring proper execution of all required analyses.

3.0 QUALITY ASSURANCE/QUALITY CONTROL

Standard quality assurance/quality control (QA/QC) protocols will be followed during this sampling program to ensure that the results of this sampling are of sufficient quality and can be used to reliably indicate the presence or absence of constituents. QA/QC protocols to be utilized for this program are equivalent to those provided in *Guidance for Preparation of Combined Work/Quality Assurance Project Plans for Environmental Monitoring*, May 1984; *NEIC Policies and Procedures*, May 1978 [Revised August 1991] and *NEIC Procedures Manual for the Evidence Audit*, September 1981. The evaluation of data will involve the collection of QC samples in accordance with the sampling and analysis protocols. The QA/QC protocols will also include the systematic validation of the analytical data and the management of the analytical data in electronic format. A description of the general QA/QC program to be implemented under this program is provided in Appendix **B** with project-specific requirements discussed below.

3.1 Quality Control Samples

3.1.1 Field Samples

3.1.1.1 Contamination Control Samples (Equipment Rinsates and Trip Blanks) Equipment rinsates are used to confirm that the sample bottle, sampling device, and the sampling procedure are not contaminating the sample. Contaminant-free water is transported to the sampling point, poured over or through the sample collection device, collected in a sample container, preserved, and retumed to the laboratory for analysis. **ENVIRON** will collect one (1) field equipment rinsate blank from decontaminated sampling equipment for each matrix sampled. Rinsate blanks will be analyzed for all parameters for which the samples collected are analyzed for.

A trip blank for volatile organic compounds (VOCs) analysis consists of a contaminant-free matrix in the appropriate sample container with preservative. This sample is generated by the container preparer, transported to the field (staying with the sample containers continually), and retumed without being opened. The trip blank provides a measure of potential positive interferences introduced by sample

preservation, transportation, storage, and analysis. Since analysis for VOCs is not part of this sampling program, trip blanks will not be required.

3.1.1.2 Precision Control Samples (Field Duplicate Samples)

Analysis of duplicate samples provides information concerning the precision of the sampling and analytical processes. Two samples are taken in the field at the same location so that they represent the sample matrix as closely as possible. The results obtained from the measurement of field duplicate samples reflect the total precision of the sampling and analytical procedures and the variability in obtaining samples that are intended to represent one sampling point. ENVIRON will collect one field duplicate sample for every 20 soil samples collected; a total of two duplicate samples will be collected during this sampling program. Duplicate samples will be analyzed for all parameters for which the corresponding sample pairs are analyzed for.

3.1.2 Laboratory Samples

3.1.2.1 Contamination Control Samples (Method Blanks)

For each batch of samples processed, method blanks (using ASTM Type I to IV water and reagents) are carried throughout the sample preparation and analytical processes. These blanks are used to assess whether samples are being contaminated in the laboratory. Method blanks are specific for each analytical method and for each batch of 20 or fewer samples.

3.1.2.2 Accuracy and Precision Control Samples (Matrix Spike Samples)

A matrix spike and a matrix spike duplicate sample are created when the analyst adds a known amount of an analyte of interest into a portion of an environmental sample. The data from a matrix spike provide information on the matrix effects of a particular sample. ENVIRON will collect two matrix spike samples and duplicates for each matrix sampled. Matrix spike samples will be analyzed for all parameters for which the corresponding sample pairs are analyzed for.

3.2 Data Validation and Usability Review

ENVIRON will subject all analytical data to data validation and review of usability, including an evaluation of data quality parameters, false negatives, and detection limits. The primary purpose of the validation and review will be to determine if any qualitative and quantitative problems are evident from the laboratory QA/QC data, not to verify whether the laboratory-

reported QA/QC information is correct. Specific performance criteria to be used for this review will follow the procedures specified in Appendix B.

In addition to the general validation process described in Appendix B, all analytical data will be subject to data validation using criteria set forth in *USEPA Region II Standard Operating Procedures HW-23 Revision 0* appropriate for PCB-only analyses. The primary purpose of this review is to determine if any quantitative problems are evident from the laboratory QA/QC data, not to verify whether the laboratory reported QA/QC information is correct. Specific performance criteria to be used for this review will follow the respective analytical method.

3.3 Data Management

All analytical data generated during this investigation will be formatted into a usable medium, such as a computer data base program. The data base will contain the analytical results received from the laboratory such as the sample identifier, the analytical parameter, the reported result and any necessary qualifier, the method detection limit and any qualifier associated with it, and the measurement units. It will also contain additional information on the sampling date, the sample medium, the sampling method, and the types of analyses to be performed on the sample. This data base will allow the generation of summary tables, graphs, and figures. It will also maintain the integrity and accountability of the original data. A copy of ENVIRON's electronic data deliverable format specifications is provided in Appendix B.

4.0 HEALTH AND SAFETY PLAN (HASP)

ENVIRON has prepared a site-specific Health and Safety Plan (HASP) to provide job safety and security in compliance with 29 CFR 1910.120; a copy of the HASP is provided as Appendix C. Specific elements to be addressed in this HASP include:

- General information including site name, address, contact, background, work objectives, names of personnel who will be on-site, and names of key personnel responsible for site safety;
- Potential physical, chemical, and biological hazards;
- A brief hazard evaluation;
- Descriptions of appropriate levels of personal protection and decontamination; and
- Emergency services information.

All ENVIRON personnel who will be conducting sampling activities at the site under this program will be required to read and sign the HASP.

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APPENDIX A

Standard Sampling Procedures

APPENDIX A

Standard Sampling Procedures

ATTACHMENT

1.0 INTRODUCTION

This document outlines standard methodologies and protocols employed by ENVIRON personnel when conducting an environmental sampling program and is intended to supplement sampling program information described in site-specific Work Plans. Included in this document are descriptions of techniques for sampling the media identified in the site-specific Work Plan; decontamination procedures; and sampling documentation procedures. This manual is designed to cover the commonly used sampling techniques. Other sampling procedures may be used depending on site-specific field conditions. These special techniques will be described in detail in Work Plans relating to the specific field sampling program. Depending on the regulatory program under which the sampling is being performed, additional sampling guidance and/or requirements should be consulted.

2.0 SAMPLING PROCEDURES

2.1 General Procedures

The following general procedures will be followed during all field sampling activities:

- The samples must be representative of the medium being sampled.

- Samples must be collected in the appropriate containers as specified by the selected analytical methodology. The sample containers must be properly cleaned to ensure that sample contamination does not occur. Only new containers prepared in accordance with USEPA container cleaning procedures will be used in the field sampling program. It is recommended that certified cleaned containers with batch QA/QC results be purchased. Used sample containers will not be cleaned and reused in this program.

- QC samples will be assigned in the field.

- The required preservatives and storage procedures must be used to minimize the loss of the analyte(s) of interest due to absorption, chemical or biological degradation, and/or volatilization.

- The appropriate volumes must be collected to ensure that the required detection limits can be met and quality control samples can be analyzed. The analytical laboratory should be contacted to determine their required sample volume. Liquid containers for VOC analysis should be overfilled, closed and sealed; if air bubbles appear when the sample vial is inverted and tapped, then the sample should be discarded and the container refilled until no bubbles are observed.

- Following collection, the samples must be properly labeled and shipped to the laboratory in a manner to ensure samples are kept at the appropriate temperature and that the holding times for the analysis can be met.

- Sample chain-of-custody procedures will be followed and are described in Section 3.3, Sample Custody.

- All sampling equipment used for more than one location will be properly decontaminated between locations.

- Sampling equipment will be placed on clean plastic sheets in the sampling area.

- Equipment requiring fuel will be refueled in an area that is a significant distance from any sampling points and the fuel will be stored away from the sampling and container storage areas to prevent volatile organic compound (VOC) contamination.

2.2 Definitions

- Discrete (Grab) Sample - An individual sample collected from a single location.

- Composite Sample - A series of grab samples that are combined to form a single sample. Each grab sample is collected in an identical manner. Equal amounts from each grab sample are used to form the composite.

- Duplicate (Replicate) Sample - Two or more samples collected simultaneously from the same source under identical conditions.

2.3 Composite Samples

Composite samples may be used to reduce the analytical time and expense. The strategies for forming composite samples include:

- Composite only samples of the same matrix (all soil or all water).

- To the maximum extent possible, composite adjacent samples within the same area of investigation.

- To the extent possible, form composites with equal numbers of samples.

2.4 Stream Sediment Sampling Procedures

Because many contaminants preferentially adsorb onto fine particles, maximum contaminant concentrations are often found in the finest-grained regions of heterogeneous sediment deposits. To collect a sediment sample from a streambed, a variety of methods can be used. Dredging (Peterson, Eckman, Ponar), coring, and scooping (BMH-60) are available. Regardless of the method used, precautions shall be taken to insure that the sample collected is representative of the streambed.

- For routine analyses, the dredge can be used when the bottom is rocky, in very deep water, or when the stream velocity is high. The dredge should be lowered very slowly as it approaches bottom, because it can displace and miss lighter materials if allowed to drop freely.

- Core samplers are used to sample vertical columns of sediment. They are particularly useful when a historical approach to sediment deposition is desired for they preserve the sequential layering of the deposit.

- If the water is wadeable, the easiest way to collect a sediment sample is to scoop the sediment using a stainless steel spoon or scoop. This reduces the potential for cross-contamination. This can be accomplished by wading into the stream, and while facing upstream (into the current), scooping the sample along the stream bottom in the upstream direction. If the stream is too deep to wade but less than eight feet deep, a stainless steel scoop attached to a piece of conduit can be used either from the banks if stream is narrow or from a boat.

Regardless of the method of collection, sediment samples collected for chemical analysis should be thoroughly mixed before being placed in the appropriate sample containers. When sampling sediment from beneath a flowing body of water, downstream locations are sampled first so that subsequent samples will not be affected by disturbances that result from sampling. Caution should be exercised not to disturb the area to be sampled when the sample is obtained by wading into shallow water. If the sampling device must be inserted into the sediment repeatedly to obtain an adequate sample volume, the material will be thoroughly mixed prior to filling sample jars (see Section 2.5.3). Before collecting a sample for chemical analysis, all sampling equipment must be decontaminated using the procedures described in Section 2.0.

Sampling depths and physical description of the sample, along with any other pertinent observations (e.g., unusual discoloration) will be recorded in field notes. During sampling, a

physical description of the stream (e.g. width, depth and flow rate) at the sampling location will also be recorded in the field notes.

2.5 Soil Sampling Procedures

The methods and equipment used for soil sampling depend on the sample depth, type of sample, and type of soil. All sampling equipment that comes in contact with the soil must be decontaminated prior to reuse following the procedures described in Section 2.0. Unless otherwise specified in the Work Plan all soil samples will be homogenized prior to placement in laboratory-supplied sample jars to ensure laboratory results are representative of the entire interval sampled. All sample locations will be marked with a surveyors stake or flag for future reference.

Soil sampling depths and physical description of the sample, along with any other pertinent observations (e.g., unusual discoloration) will be recorded in field notes. During drilling of deep borings, a geologic log, including a physical description of soils encountered, depths of lithologic changes, and the depths and identification numbers of the samples collected for chemical analysis, will be recorded in the field notes.

2.5.1 Surface Soils

Surface soil samples will generally be collected from ground surface to a maximum of 24 inches below ground surface. These samples can be collected using hand equipment such as spoons, shovels, trowels, push-tubes, and/or post-hole diggers constructed of steel or stainless steel. Surface samples may also be collected in conjunction with the use of heavy equipment.

If a sample cannot be collected at the designated location, an adjacent location will be selected. The new location and reason for changing will be documented in the field notes. If a thick, matted, root zone is encountered at the surface, it will be removed prior to sampling. Other foreign objects will be removed prior to sampling.

Unless otherwise required, the soil sample will be placed in a stainless steel bowl or pan and thoroughly mixed prior to placing in the sample container. Large stones, twigs, debris, and other foreign organic matter will be discarded from the sample prior to mixing. Section 2.5.3 contains recommended procedures for mixing soil samples.

2.5.2 Subsurface Soils

Subsurface soil samples will generally be collected below 24 inches below ground surface, one sample at a time, using a new sampling device each time. Subsurface soil sampling may require a hand auger, a trowel, a split spoon, direct push sampler (e.g., Geoprobe) and/or a backhoe. If a vertical composite sample is required over the sampling interval,

the same sampling device may be used to collect the samples. If discrete grab samples are required, the sampling device must be decontaminated between samples. The top few inches of the soil should be removed from the sampling device to minimize cross contamination due to "fall-in" of material from the upper portions of the hole.

2.5.3 Soil Sample Mixing

The soil sample will be placed in a stainless steel bowl or pan and thoroughly mixed prior to placement in the sample container. Large stones, twigs, debris, and other foreign organic matter will be discarded from the sample prior to mixing. Soil samples should be mixed as thoroughly as possible to ensure that the sample is representative of the sample interval. A common method of mixing is "quartering." The sample is placed in the sample pan or bowl and divided into quarters. Each quarter is thoroughly mixed and all quarters are mixed together. This procedure is repeated several times until the sample is thoroughly mixed. If a round bowl is used, the sample can mixed by stirring in a circular maimer and occasionally turning the material over.

2.6 Ground Water Sampling Procedures

Ground water samples will be collected using either peristaltic pumps or stainless steel or Teflon bailers. Prior to collecting samples, clean plastic sheeting should be placed on the ground to provide a clean work area. All sampling equipment that comes in contact with the ground water must be decontaminated prior to reuse following the procedures described in Section 2.0. Pumps used for purging the well prior to sampling should not be used for sampling. If required, samples for VOC analyses will be collected first using a bailer with minimum agitation. Samples for metals analysis will be filtered using 0.45-micron dedicated field filters; samples for organic compound analyses will not be filtered.

Prior to sampling, the monitoring wells will be purged of three to five times the volume of standing water in the well and until the specific conductance, temperamre, and pH of the ground water are stabilized before sampling. Depth to water measurements from the top of the well casing will be made prior to purging to determine the existing well volume. Wells can be purged by using in-place plumbing/pumps or peristaltic, turbine, bladder, centrifugal, or other appropriate pump. A Teflon or stainless steel bailer may also be used. If possible, wells should not be pumped dry during purging; however, if a well is pumped dry before removing the specified volume of water, the well can be sampled following recovery. Purge water will be collected for proper disposal.

Prior to purging and sampling, the depth to water and total well depth will be measured, and the physical condition of the well will be inspected and recorded on the field sampling data log (see Attachment A-1). The specific conductance, temperature and pH measurements, and

any physical characteristics of the ground water (e.g., color, sheen, odor, mrbidity) observed at the time of purging and sampling, and the purge rate, if applicable, will also be recorded in the field log.

2.7 Sample Designation

Field sampling personnel are responsible for the description, documentation, labeling, packaging, storage, handling, and shipping of samples obtained in the field so that all samples can be readily identified. These practices are necessary to ensure the integrity of the sample from collection through laboratory analysis and data reporting.

2.7.1 Sample Labels

Sample labels and tracking via Chain-of-Custody forms are of critical importance in the collection of samples. Field personnel will attach a sample label with a unique sample identification to each sample container either before or immediately after filling each container. The sample labels will be placed on the sample containers so as not to obscure markings on the containers; sample information must be printed legibly using waterproof ink. The label must contain sufficient information so that the sample can be identified on the sampling information form or sample collection log. All data for a sample are keyed to its unique sample designation. This sample designation on all sample containers and associated field data forms is utilized for data recall from the data base system. Additional information on sample custody and the Chain-of-Custody forms is provided in Section 3.3.

2.7.2 Sample Identification

The sample numbering scheme described below has been developed to standardize data that will be entered into the central environmental data base. This identification scheme will allow sorting and recall of data by location, type, and other key information, as well as tracking of samples from collection and disposal.

Each sample collected during field work must be identified by a unique alphanumeric code with the following format:

CDI01-DS-01__

-- The first sequence begins with the character set "CD I", consistent with the labeling code used by USEPA for this property. The site code is followed by two digits indicating the sample number.

-- The second sequence consists of two characters (i.e., DS, for discrete soils, DD, for discrete sediments) that identify the sample matrix.

-- The third sequence consists of two digits indicating sampling interval (i.e., 01 would be the first interval, for example, 0 to 0.5 feet). These digits may be followed by two characters designating field QA/QC samples, when appropriate. In the above example, the last two spaces are left blank, since this is a field sample and not a QA/QC sample. QA/QC codes include:

  -- MS - Matrix Spike
  -- SD - Matrix Spike Duplicate
  -- MD - Matrix Duplicate
  -- FD - Field Duplicate
  -- RS - Rinsate Blank
  -- FB - Field Blank
  -- TB - Trip Blank

Hyphens must be inserted in sample ID numbers only as shown in the above example. Spaces will not be used. All letters must be capitalized.

The sample ID scheme described above shows the minimum number of characters that must be shown in a sample identifier. Additional sequences may be added if needed for a specific project; however, the number of characters may not exceed 30, including hyphens. Additional fields may be added only at the end of the standard ID sequence. If the project does require additional sequences or a different numbering system, the numbering scheme must be approved prior to use.

2.8 Sample Preservatives, Containers, and Holding Times

Samples for chemical analysis will be collected and preserved in accordance with appropriate USEPA specifications. For each parameter, the required type of container, volume of sample, sample temperamre, type and concentration of preservative, and allowable holding times must be defined. All samples will be placed in individual pre-cleaned containers for shipment to the laboratory. The containers will be obtained from the laboratory designated to perform the analyses. The sample preservative, containerization, and holding times for chemical analyses are identified in the site-specific Work Plan; stated sample holding times must be met unless otherwise specified in the analytical method or site-specific Work Plan. The samples will be shipped by surface or overnight carrier to minimize the time between collection and laboratory processing.

Solid samples for chemical analysis will be packaged, labeled, and placed in coolers with ice as soon as possible after collection. Solid samples for physical properties analysis will be sealed in airtight plastic jars, sample liners, or bags for shipping to the laboratory. Water samples will be bottled, labeled, and placed in coolers immediately after sample collection. Samples will be kept at a constant temperature during storage and shipping per requirements of the analyses requested for the characterization and remediation efforts. If required by the site-specific Health and Safety Plan (HASP), personal monitoring samples will be sealed and shipped in ziploc bags and padded coolers to ensure that samples are not exposed to elevated temperamres.

2.9 Sample Packaging and Shipping

The following procedures will be followed for packing samples for shipment to the laboratory:

- Check all sample container caps for tightness.
- Tape cooler drain plug shut with strapping tape.
- Place the sample containers in the cooler, allowing sufficient space for the addition of packing material between the sample containers.
- Place bags of ice, blue ice packs, or equivalent on top of and between the samples. Sufficient ice must be used to ensure that the samples are transported at the correct temperature (4°C unless otherwise specified).
- Place a copy of the Chain-of-Custody form in a sealed clear plastic envelope and tape it to the underside of the cooler lid.
- Tape the shipping coolers shut with strapping tape if coolers will be transported by air courier.
- Affix custody seals securely to the coolers such that any attempt to open the coolers would be evident to the recipient.

Samples will be shipped at the end of each sampling day to the laboratory via surface or overnight courier so that samples will arrive no later than the day following sample collection.

3.0 EQUIPMENT DECONTAMINATION PROCEDURES

All equipment will arrive on-site in clean condition. All equipment used to collect samples will be decontaminated prior to use and between each use using the following or equivalent procedure:

- Place dirty equipment on plastic ground sheet or in similar containment area;
- Wash thoroughly with a laboratory detergent (Alconox or equivalent) to remove any particulate matter and/or surface films using bristle brush, as needed (sampling equipment with oil or other hard to remove materials may require rinsing with isopropanol prior to washing with the detergent solution);
- Rinse thoroughly with clean potable water;
- Rinse thoroughly with clean deionized water;
- Rinse with isopropanol;
- Rinse thoroughly with clean deionized water;
- Air-dry; and
- Wrap decontaminated equipment in aluminum foil (shiny side out) for storage and transportation.

Prior to the start of any drilling activities and between drilling locations, all drill rods, augers, and bits will be steam-cleaned. Power augers, etc. may be cleaned wither a power washer, steam cleaner, or hand washed with a brush using detergent to remove oil, grease, and hydraulic fluid from the exterior of the unit. These units should be rinsed thoroughly with potable water. Backhoe or track-hoe buckets should be decontaminated using a high-pressure steam cleaner and potable water. The bucket should be wrapped in plastic for transportation between excavation locations.

Prior to implementing decontamination activities, an area will be designated for these activities. This area will be covered with plastic sheeting to prevent runoff of washwater generated during the decontamination operations. Liquids and wastes generated from decontaminating equipment will be contained for proper disposal.

4.0 DOCUMENTATION PROCEDURES

4.1 Daily Field Reports

A field activity daily log will be used as a record of daily field activities showing the sequence of events. At a minimum, the log will include the following information:

- Project name and number;
- Date;
- Starting/ending time and namre of each field activity;
- Names of all personnel on the site, including visitors;
- Weather conditions;
- References to appropriate field logs for details of each activity performed;
- Identification of any photographs taken;
- A list of rented, leased, or subcontracted equipment; and
- Signature of field manager or designee.

The field manager is responsible for ensuring that all activities are documented in the field activity daily log and that the details of each activity are recorded on the appropriate field documentation form. Regular field reports will be submitted to the project manager; these reports will highlight any significant variances from the sampling locations, depths, or procedures specified in the site-specific work plan.

4.2 Variance Log

Variances from approved operating procedures in the quality assurance project plan or the HASP will be discussed with the field manager and documented in the project file. Under the supervision of the field manager, the field staff will be responsible for initiating and chronologically maintaining a log of the variances. Variances affecting project scope and/or schedule must be approved by the project manager.

4.3 Sample Custody

All samples that are collected at a station will be accompanied by a Chain-of-Custody record (see Attachment A-2). The following information will be recorded in the indicated spaces to complete the Chain-of-Custody record:

- Project name and number;
- Name of sampler;
- The sample number, location, date and time collected, and sample type;
- Analyses requested;
- Any special instructions and/or sample hazards;
- Signature of sampler in the designated blocks, indicating his/her company, date, and time; and
- The condition of the sample on receipt will be completed and reported by the analytical laboratory.

The following chain-of-custody procedures will be followed for all samples submitted to the laboratory for chemical or physical properties analysis:

- Each individual field sampler is responsible for the care and custody of samples he or she collects until the samples are properly transferred to temporary storage or for shipping.

- A Chain-of-Custody form will be completed by the sampler for all samples collected and submitted to the laboratory.

- A custody seal will be signed, dated, and placed on shipping containers as necessary to detect tampering. Strapping tape should be placed over the seals to ensure that the seals are not accidentally broken during shipment.

- Each time responsibility for custody of a sample changes, the new sample custodian will sign the Chain-of-Custody form, and note the date and time that the change occurred.

- A copy of the carrier airbill will be retained as part of the permanent Chain-of-Custody record.

- The laboratory will record the condition of the sample containers upon receipt.

- The Chain-of-Custody form will be faxed to the project manager from the laboratory upon receipt of the samples.

- Changes or corrections to the information documented by the Chain-of-Custody form (including, but not limited to field sample ID or requested analyses) must be changed and initialed by the person requesting the change. In situations where the request comes from the project manager, a copy of the Chain-of-Custody form will be altered, initialed, and forwarded to the laboratory, where it will supersede the original Chain-of-Custody form.

- The original Chain-of-Custody form and any documented changes to the original will be retumed from the laboratory as part of the final analytical report to the project manager. This record will be used to document sample custody transfer from the sampler to the laboratory and will become a permanent part of the project file.

- Samples received in the laboratory will be inspected for physical damage. The integrity of custody seals will be checked and noted. Sample coolers will be inspected to ensure ice added in the field is still present such that significant temperamre variations should not have occurred during shipping. Sample identification numbers will be compared with Chain-of-Custody records. Samples will be logged and secured in controlled, refrigerated sample storage areas as necessary prior to analysis.

- The laboratory will maintain an intemal Chain-of-Custody form, tracking custody of the samples within the lab. A copy of these forms will also be included with the data packages and become a permanent part of the Chain-of-Custody record in the project file.

4.4 Photographs

Color photographs may be taken of representative sampling locations and the surrounding site to show the area, sampling equipment, and related site activifies. Frame and roll numbers will be logged on the appropriate field documentation form to identify photographs with the correct sampling location.

4.5 Document Maintenance

Field personnel are responsible for recording field activities on the appropriate field documentation form in sufficient detail to allow the significant aspects of the event to be reconstructed without relying on memory. It is the responsibility of the field managers to ensure that all documents are complete and legible. At the end of each day, all documents completed that day will be reviewed by the field managers for accuracy, completeness, and

legibility. Completed field documents (a copy or original, depending on the type of form) will be maintained on-site in chronological order with other completed forms of the same type until the completion of the field activity. Copies of specific forms will be sent to the project office on a weekly basis at a minimum for management purposes unless waived by the project manager. Upon completion of the field investigation, all original field records and copies will be transferred to the project manager for review. File and working copies will be retained by project personnel for data evaluation and report preparation, as necessary.

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ATTACHMENT A-1

Monitoring Well Sampling Form

ENVIRON Ground Water Sampling Data Log

Site Name _____ Well or Surface Site No. _____

Site Location/Address _____ Sample Designation _____

Case Name _____ No. _____ Date, Time _____

Manager _____ Weather _____

Sampling Personnel _____

Water Level Measurements:

DTW (Nearest 0.01 ft.)	Elevation	Date, Time	Method Used (Slope Indicator No. or Other)	PID (ppm)

Depth to Bottom _____ (ft) - Depth to Water _____ (ft) x _____ Gal/Ft = Well Volume _____ Gallons

Well Evacuation:

# Gallons	# Well Volumes	Method Used	Flow Rate	Decon Method	Date, Time
					(begin)
					(end)

Field Water Quality Tests:

Well Vol #	# Gallons	pH	Conductivity (ms/cm)	Temp (°C)	D.O. (mg/L)	Redox	Turbidity	Comments

Sampling Data:

Sample Type (VOCs, etc.)	Date, Time	Sampling Method	Volume (ml)	Container Type	Depth Taken (ft)	Field Filtered (Yes/No)	Preservative	Sampler Cleaning Method (Circle)
								Lab decon
								Alconox wash
								H_2O rinse
								Distilled H_2O rinse
								MeOH rinse
								Acid rinse

Notes: (color, clarity, odors, etc.) _____

Well diameter _____ inches

Gallons per foot of casing/hole _____

2 in. = 0.163; 4 in. = 0. 653; 6 in. = 1.469

Total No. of Bottles _____ Signature _____

ATTACHMENT A-2

Sample Chain-of-Custody Form

ENVIRON

Counsel in Health and Environmental Science

CHAIN-of-CUSTODY FORM

Sheet Of
214 Carnegie Center, Suite 201
Princeton, New Jersey 08540
(609) 462-0000

PROJECT NAME: _____

CASE NO.: _____

ENVIRON SAMPLE ID.	COLLECTION DATE	COLLECTED BY (initials)	MATRIX	TOTAL NO. OF CONTAINERS	ANALYSES:												COMMENTS
TOTAL	X	X	X														

Relinquished by:	Date:	Time:	Received by:	Company:	Date:	Time:
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

APPENDIX B

Quality Assurance/Quality Control Protocols

APPENDIX B

Quality Assurance/Quality Control Protocols

TABLES

ATTACHMENT

1.0 INTRODUCTION

ENVIRON quality assurance/quality control procedures Quality assurance/quality control protocols should be followed during all sampling programs defined in site-specific Work Plans to ensure that the results of this sampling are of sufficient quality to meet the data quality objectives for the given project. The evaluation of data will generally involve the collection of QC samples in accordance with the sampling and analysis protocols. QC procedures for measurements not involving the collection of samples are limited to checking the reproducibility of the measurement in the field by obtaining multiple readings. The QA/QC protocols will also include the systematic validation of the analytical data and the management of the analytical data in electronic format.

2.0 INTERNAL QUALITY CONTROL

2.1 Quality Control Samples

Intemal quality control includes contamination control samples (equipment, method, and trip blanks), precision control samples (field and laboratory duplicates), and accuracy control samples (spiked samples). A detailed listing of the types of quality assurance samples and the frequency of sampling is presented in Table B-1.

2.1.1 Contamination Control Samples (Equipment Rinsates and Trip Blanks)

Equipment rinsates are used to confirm that the sample bottle, sampling device, and the sampling procedure are not contaminating the sample. Contaminant-free water is transported to the sampling point, poured over or through the sample collection device, collected in a sample container, preserved, and retumed to the laboratory for analysis.

2.1.2 Precision Control Samples (Field Duplicate Samples)

Analysis of duplicate samples provides information conceming the precision of the sampling and analytical processes. Two or more samples are taken in the field so that they represent the sample matrix as closely as possible. The results obtained from the measurement of field replicate samples reflect the total precision of the sampling and analytical procedures and the variability in obtaining samples that supposedly represent one sampling point.

2.1.3 Accuracy Control (Field Spiked Samples)

A field spiking program will not be implemented unless a specific need arises that cannot be rectified by laboratory quality control or blind QA/QC samples.

2.2 Laboratory Quality Controls

2.2.1 Contamination Control Samples (Method Blanks)

For each batch of samples processed, method blanks (using ASTM Type I to IV water and reagents) are carried throughout the sample preparation and analytical processes. These blanks are used to assess whether samples are being contaminated in the laboratory.

TABLE B-1 Frequency of Analysis of Quality Assurance Samples	
QA Sample Type	**Frequency of Analysis**
Contamination Control Samples	
Laboratory Method Blank	One per each analytical method. One in every batch of samples (not to exceed 20 samples).
Trip Blank	One per cooler if VOCs are tested; analyze for VOCs only.
Equipment Rinsate/Field Blank	One per analytical method. One per sampling day/event or one per 20 samples.
Accuracy Control Samples	
Performance or Blind Check Samples	As needed based on QA/QC review.
Surrogate Spiked Samples	Surrogate will be spiked and analyzed in all samples and in all blanks for GC and GC/MS methods.
Matrix Spike Samples	One per 20 samples; performed on field designated samples.
Precision Control Samples	
Field Replicate (Duplicate) Sample	One per each analytical method. One out of every 20 samples.
Matrix Spike Duplicate Samples	One per 20 samples; performed on field designated samples.

Method blanks are specific for each analytical method, and each batch of 20 or fewer samples.

2.2.2 Accuracy and Precision Control Samples (Matrix Spike, Matrix Spike Duplicate, Laboratory Control, Laboratory Duplicate, and Surrogate Spiked Samples)

A matrix spike and a matrix spike duplicate sample are created when the analyst adds a known amount of an analyte of interest into a portion of an environmental sample. The data from a matrix spike provide information on the matrix effects of a particular sample. The acceptance criteria for the results of analysis of spiked samples are the limits of recovery defined in the USEPA methods identified in the Work Plan.

Laboratory control samples (LCS) represent laboratory control matrix spikes in which a consistent matrix is spiked with a known analyte level in the normal analytical range. The purpose of the control sample is to check the precision and accuracy of the method and the laboratory procedures. The results of a control sample analysis must fall within ± 3 standard deviations (control limits) of the average recovered concentrations. (A control sample must be analyzed and yield results within standard control limits before samples can be analyzed.)

A laboratory duplicate consists of a duplicate sample analysis performed for inorganics by the laboratory. The percent difference data generated by these analyses are used to indicate the precision of the sample results and evaluate the long-term precision of the methods within the confines of the sample matrix.

A surrogate spike sample is created when measured amounts of certain compounds are added before sample preparation or extraction (except for volatile samples, which are spiked prior to analysis). The analyst measures the recovery of the surrogate to determine systematic extraction or analysis problems. Surrogate spike recoveries should fall within the control limits specified in the prescribed USEPA methods identified in the Work Plan. Dilution of samples to bring the analyte concentration into the linear range of calibration may dilute the surrogates outside of the quantification limit; assessment of the analytical quality in these cases will be based on the quality control results from other spiked samples.

3.0 DATA REPORTING, ASSESSMENT AND VALIDATION

Collection and ultimate presentation of reliable data is a primary focus of the characterization activities. The effort to ensure reliable data begins prior to data collection as sampling and analysis procedures are evaluated in regard to their ability to generate the appropriate, technically acceptable information required to achieve project objectives. This QAPP meets this requirement by establishing objectives in terms of quality parameters, analytical methods, and protocols. During and after data collection, results are assessed to assure that the procedures are effective and that the data generated provides sufficient information to achieve project objectives.

3.1 Laboratory Analytical Data Deliverables

The analytical data verification program is primarily designed to ensure that documentation and data are reported using established reporting requirements and that all requested analyses are performed. This process will be completed in accordance with approved procedures. Data assessment and reporting by the laboratory will be performed according to method specifications. The remainder of the data verification program consists of tracking of data delivery and review of the following: sample identification, Chain-of-Custody forms, analytical holding times, requested turnaround time, data results, and data quality parameters.

3.1.1 Data Reporting

The data will be reported in a format that will allow the review and/or validation of samples analyzed under the protocols described in the site-specific Work Plan. The data package will include all the elements required to validate deliverable data. The data package will be prefaced by a Data Summary Report which summarizes the sample and QC results detailed in the complete data package. The Data Summary Report will include all sample tracking information such as title page, sample cross reference, sample analysis request form, field Chain-of-Custody form, and internal chain-of-custodies delineating internal sample transfers or subcontracted analyses. The complete data package will include all elements of the Data Summary Report plus all relevant data as outlined in Table B-2. The laboratory data packages will contain the following items:

TABLE B-2 Deliverables Required for Analytical Data Package Polychlorinated Biphenyls (PCBs) - Method SW8082
QC SUMMARY
Tabulated Target Compound Results for Samples, Method Blanks and MS/MSDs, (non-spiked compounds) (CLP Form I Pest or equivalent)
Surrogate Percent Recovery Summary (CLP Form II Pest or equivalent)
Matrix Spike/Matrix Spike Duplicate Summary (CLP Form III Pest or equivalent)
Method Blank Summary (CLP Form IV Pest or equivalent)
Initial Calibration (CLP Form VI Pest or equivalent)
Final Calibration (CLP Form VII Pest or equivalent)
Surrogate Retention Times (CLP Form VIII Pest or equivalent)
PCB Standards Summary -- All Columns (CLP Form IX Pest or equivalent)
PCB Identification -- Positive Results Only (CLP Form X Pest or equivalent)
Analytical Sequence Form (CLP Form XII Pest or equivalent)
COMPLETE DATA PACKAGE
Sample Data
Chromatograms -- All Columns
Data System Printouts -- All Columns
Manual Work Sheets
GC/MS Configuration Data -- Spectra
Standard Data
PCB Standard Chromatograms and Data System Printouts for All Associated Standards
Raw QC Data
Blank Data
Chromatograms and Data System Printouts -- All Columns
Matrix Spike/Matrix Spike Duplicate
Chromatograms and Data System Printouts

- Laboratory name and address;
- Case narrative which includes general comments, a description of the sample types, analyses performed, any sample reanalysis performed, problems encountered, and corrective action results. Specific information regarding quality control results that are outside the control limits or other factors that affect the data use will be discussed. These discussion will include the problem, corrective action, results of corrective action, and effect on the reported results.
- Sample cross reference;
- Completed Chain-of-Custody forms;
- Method reference; and
- Relevant summary forms specified in Tables B-2.

The form numbers listed in Tables B-2 refer to CLP forms; however, summary forms contained in Chapter ONE of SW-846, Third Edition (Revision 0, 1986) or equivalent may be used.

Delivery of analytical data will be tracked to ensure that the requested laboratory services are performed in an accurate and timely manner. Data delivery is logged manually on the Chain-of-Custody form. After the data reports are received, they are to be reviewed to determine if all contractual format requirements have been met. In addition, data are to be reviewed to confirm that all requested parameters are received. All analytical data will be reviewed by technical persoimel familiar with the monitoring program or investigation. Sample data will also be compared with the QA/QC samples collected or analyzed within the same sample lot. The data review will be used to report inconsistencies in concentrations, sampling procedures, and sample identification.

3.1.2 Laboratory Data Review

Prior to submission of analytical data, the analytical laboratory will review the data with respect to the analytical method requirements. The analytical laboratory will review the analytical data and data package to ensure:

- Holding times have not been exceeded;
- Sample preparation information is correct and complete;
- Analysis information is correct and complete;
- The appropriate analytical methods and/or SOPs have been followed;
- Instrument calibration and QC data are within prescribed limits and documented;
- QC samples are within prescribed control limits;
- Any special sample preparation and analytical requests have been met;

- Component identification is correct;
- Quantitative results are correct;
- Common laboratory contaminants are identified;
- Unexpected results are noted; and
- Data package (to include electronic deliverables) is complete and acceptable for transmittal.

All data will be reviewed by someone other than the analyst who generated the data. Any errors that are identified and corrected during the review process should be documented. Clarification of procedures and/or additional training should be implemented to ensure that the errors do not recur. Samples will be reanalyzed as deemed appropriate by the laboratory personnel.

3.2 Assessment of Field Data

Field data collected during the field activities will be assessed by checking the procedures used and comparing the data to previous measurements. Field QC samples will be evaluated to ensure that field measurements and sampling protocols have been observed and followed. The following will be assessed:

- Use of standard operating procedures;
- Calibration method and frequency;
- QC lot number;
- Date and time sampled;
- Preservation;
- Samplers;
- Laboratory;
- Chain-of-Custody forms; and
- Date shipped.

The field data will be reported as follows:

- Groimd surfaces will be surveyed to 0.01-foot, horizontal coordinates to the nearest 0.1 foot; and
- Sampler blow counts will be rounded to the nearest blow per 6-inch sampling interval.

Data obtained from field measurements will be assessed by the field staff. The validity of all data will be determined by checking calibration procedures utilized in the field, and by comparing the data to previous measurements, if any, at the specific site. Large variations (greater than 50 percent) will be examined for possible recollection of data or assignment to a lower level of analytical data quality.

3.3 Data Validation

Data validation is the process of reviewing laboratory records of analytical data and quality-related field data to assess laboratory performance as compared to QC criteria, data quality requirements, and procedural requirements. The purpose of validation is to document the quality and usefulness of the data and the documentation developed during the sample analysis; in particular, the purpose of the data validation is to determine if any quantitative problems are evident from the laboratory QA/QC data, not to verify whether the laboratory reported QA/QC information is correct. Specific performance criteria to be used for this review will follow the appropriate analytical method. Where no criteria exist, performance criteria will follow the appropriate Functional Guidelines and USEPA regional guidance. Validation of analytical data will include an evaluation of data quality parameters, false negatives and negatives, and detection limits.

Calculations that interpret and analyze data will be performed in a plaimed, controlled, and documented manner. Calculation documentation for interpretation and analysis will be provided, such that a technically qualified person may review, understand, verify, and duplicate the calculations without recourse to the originator. Calculations will be legible, complete, and in a form suitable for reproduction, filing, and retrieval. Calculations will be identifiable by subject, originator, reviewer, and date. Calculation documentation will include the following:

- Definition of the objective of the interpretation/analysis;
- Definition of inputs and their sources;
- A listing of applicable references;
- Results of literature searches or other background data;
- Identification of assumptions;
- Identification of any computer calculations, including computer type, program name; revision, input, output, evidence of program verification, and the bases of application to the specific problem; and
- Signature and dates of the review and approval by appropriate qualified persomel.

The data validation process consists of reviewing and evaluating the analytical documentation supporting the data resulting from laboratory analyses. The analytical process itself is first evaluated by reviewing the laboratory analytical records to ensure compliance with the procedures governing the analyses. These records may include, but are not limited to, sample custody records, sample preservation logs, instrument printouts, calibration checks, and initial calibration data. Second, the data validation process evaluates the data for precision, accuracy, and completeness by comparing the data to the field blank, duplicate sample, and MS/MSD sample analysis results and the corresponding laboratory QA/QC data.

At a minimum, ENVIRON will review and qualify 100% of the data packages by reviewing the applicable summary forms (Tables listed in Table B-2) and certain raw data for the items listed below. The data packages will be reviewed against performance criteria in the appropriate analytical method and the data quality objectives (DQOs) defined for the given project. All analytical results will be reviewed, and for each analyte (in each matrix) the following items will be assessed as appropriate:

- Surrogate percent recoveries;
- Method blank data;
- GC/MS tuning and mass calibrations;
- Initial calibration summaries;
- Continuing calibration summaries;
- Matrix spike recoveries;
- Matrix spike/matrix spike duplicates;
- Field duplicates;
- Field and trip blanks;
- Identification of outliers; and
- Calculation of overall completeness.

The laboratory results will also be reviewed for:

- Unexpected results;
- Common laboratory contaminants; and
- Unusual spatial concentration/analyte relationships.

If problems are noted in this review, the data packages will be further reviewed to determine if the problem is random or systematic. If systematic problems are noted the analytical laboratory will be contacted immediately. Data are qualified based on the results of this validation.

3.4 Data Qualification

The purpose of the data qualification process is to determine and summarize the quality and reliability of the analytical data and to document any factors which affect the data usability. The data qualification process consist of a review of the laboratory and field data. Qualification will be performed by ENVIRON. The data will be qualified as "accepted without any qualifications"(no flag), "accepted with noted qualifications"(flagged with a "J" or "UJ", or "unusable" (rejected, flagged with an "R") based upon the review process. ENVIRON will determine if "rejected" results are critical to the program and resampling and reanalysis is required. Information used in the qualification process will include:

- Chain-of-custody documents;
- Laboratory data packages;
- Information from the sampling team on field conditions and field QC samples;
- Sampling location;
- List of all field samples obtained; and
- This QAPP.

4.0 DATA MANAGEMENT AND RESULTS REPORTING

4.1 Data Management

Environmental data will be prepared in a manner consistent with ENVIRON's Electronic Data Deliverables Format Specification Document (EDD) (see Attachment B-1). In order to standardize data entry into the data base, all field and analytical data, custody records, and sample delivery group information will conform to the format specified in these SOPs. The EDD has been implemented to ensure that data quality standards are being met. The data base is intended to enhance the data review process by standardizing the structure and terminology of data elements collected and reported by field investigation contractors and laboratories, to serve as a central repository for storage and retrieval of data, and to allow flexible exportation of data to major software applications supported by ENVIRON.

The data base is intended to store only final analysis results, so multiple sample reanalyses will not be included.

4.2 Data Reporting

All data reports resulting from the implementation of a site-specific Work Plan should consist of a presentation of the raw analytical data, summaries of the validation and verification effort, as well as interpretative efforts relative to the data.

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ATTACHMENT B-1

Electronic Data Deliverables Format Specification Document
(Effective July 1997)

1.0 GENERAL REQUIREMENTS

1.1 Transfer Media

Files must be transferred to ENVIRON Corporation on MS-DOS formatted diskettes (i.e., IBM). The recommended size/density for these diskettes is 3.5 inch/1.44 Megabyte diskettes. Each Sample Delivery Group (SDG) (i.e., data pack) should be sent on a separate diskette.

Note: For large volumes of data (e.g., 10 SDGs or data files in excess of 1 MB), contact the ENVIRON Environmental DBA to discuss altematives.

1.2 Character Set

ENVIRON Corporation data files must be provided in the ASCII Character Set. Furthermore, all character information, except for *analyte* field values, must be provided in ***UPPER CASE***. The *analyte* field may be provided in mixed case.

1.3 Record Terminator

Within each data file, the individual records must be terminated by a carriage retum (ASCII Character 13).

1.4 Field Delimiter

The required field delimiter is the comma character (**,**, ASCII Character 44).

To further ensure the field delimitation, ENVIRON Corporation requires the inclusion of double quotes (", ASCII Character 34) on either side of character data field values (e.g., "1,2,3-Trichloroethane",34.4,"B",10.0,"MG/L"). Double quotes must not be placed around numeric values.

1.5 White space

All extraneous white space characters (e.g., spaces, tabs, blanks) must be eradicated from the data file. All data fields must be trimmed (i.e., clipped) to remove leading and trailing white space.

1.6 Diskette Label

The diskette label must contain the following information:

- Project Name
- Project Point of Contact
- Laboratory Name
- Laboratory Job
- File Names contained on diskette

1.7 Transfer of data diskettes to ENVIRON

The following guidelines must be followed for the shipping of data diskettes to ENVIRON:

- Diskette should be shipped at the same time as the data pack for the SDG.

- Diskettes must be shipped to ENVIRON in appropriate protective packaging.

- The outside of the package must be clearly labeled with the following: *Magnetic Media Enclosed -- DO NOT X-RAY*, regardless of the shipper used.

2.0 ANALYTICAL SAMPLE RESULTS FILE

2.1 Overview

The analytical results file capmres the final results of each of the analyses run on the set of field samples. To facilitate the loading process, these records should be sorted in ascending order by the following fields:

- FIELDID
- METHOD
- LABSAMPLEID
- ANALYSISDATE
- LABNAME

SPECIAL NOTE
Unless specifically requested, the following classes of QA results should be omitted from the Analytical Sample Results File: • Surrogate Recovery • Lab Duplicate • Matrix Spike • Method Blank

2.2 File Information

2.2.1 File Name

The sample results data records must be provided in a file called *<SDG>.C3*; where <SDG> stands for the identifier for sample delivery group being transmitted.

2.2.2 File Contents

This file should include the optimal sample results records for the current SDG being reported, except for analyses with the unacceptable results for a given sample.

For example, if there is a high concentration of arsenic in the sample, requiring several dilutions to bring the value within the calibration limits of the equipments, only the final dilution of arsenic should be reported. However, the other analytes that were within bounds prior to dilution of the sample should be reported at the original dilution.

2.3 Chain of Custody Correspondence

The information provided in the analytical sample results data records must strictly correspond to the information reported to the laboratory on the Chain of Custody. This information may not be altered, have additional information appended to it, or have additional information prefixed to it.

SPECIAL NOTE
The following fields must *exactly* match the information provided on the chain of custody: • Field ID • Matrix • Method

For example, if the Field ID reported on the chain of custody is 1786H-MW01-950501, that is the string which must be returned -- not 1786H-MW01-950501R, not 1786H-MW01-950501DL, not 1786H-MW01-950501RE. These types of additions are acceptable on the Lab ID and the EPA ID field values.

2.4 Data Record Structure

The following table defines the record structure for the analytical sample results data records. All fields listed in the record structure must be included in the data record. If a particular data field is not available, a null placeholder must be placed in the data record to account for the missing value (e.g., "Field 1 Value",,"Field 3 Value",...).

Note: All fields marked with a Y in the Req. (Required) column in the table below must be populated in the data record.

Field Seq.	Field	Type	Max Size	Description/Comments	Req.
1	SITE	CHAR	30	Site name where the sample was taken.	N
2	LOCATION	CHAR	30	Location (i.e., node) where the sample was taken.	N
3	LABNAME	CHAR	30	Name of the lab performing the analysis.	Y
4	SDG	CHAR	20	Sample Delivery Group or Lab Batch ID associated with the sample.	Y
5	FIELDID	CHAR	50	Sample ID as it appears on the Chain of Custody.	Y
6	EPASAMPLEID	CHAR	30	EPA Sample ID.	N
7	QAQCTYPE	CHAR	30	QA/QC classification of the sample (if applicable). Expected values include: • BASE SAMPLE • TRIP BLANK • FIELD BLANK • FIELD DUPLICATE • WASH BLANK	Y
8	MATRIX	CHAR	30	Sample medium. Expected values include: • BLANK WATER • GROUND WATER • SOIL • SURFACE WATER • SEDIMENT	Y
9	LABSAMPLEID	CHAR	30	Sample ID assigned by the lab.	Y
10	METHOD	CHAR	50	Analysis method name and number. *Note: Must match CoC exactly.*	Y
11	SAMPLEDATE	DATE		Date sample was taken, as it appears on the Chain of Custody. Required Format: MM/DD/YY HH:MM	Y
12	RECEIVEDATE	DATE		Date sample was received at the lab. Required Format: MM/DD/YY HH:MM	N
13	EXTRACTDATE	DATE		Date sample was extracted or prepared by the lab. Required Format: MM/DD/YY HH:MM	N
14	ANALYSISDATE	DATE		Date sample was analyzed. Required Format: MM/DD/YY HH:MM	N
15	PREPLEVEL	CHAR	10	Fractional analysis information. Expected values include: • TOTAL • DISSOLVED • TCLP • SYN • EP	Y
16	COLORBEFORE	CHAR	10	Color of the sample before analysis.	N
17	COLORAFTER	CHAR	10	Color of the sample after analysis.	N
18	CLARITYBEFORE	CHAR	10	Clarity of the sample before analysis.	N
19	CLARITYAFTER	CHAR	10	Clarity of the sample after analysis.	N
20	TEXTURE	CHAR	10	Texmre of the Sample.	N

Field Seq.	Field	Type	Max Size	Description/Comments	Req.
21	PERCENT SOLID	NUMBER		Percent solid of the sample; inverse of moisture.	Y
22	TEST	CHAR	50	Laboratory testing details. Expected values include: • DILUTION • REEXTRACTION	Y
23	TESTVERSION	CHAR	10	Run number of the test or method.	N
24	CAS	CHAR	50	CAS number associated with the chemical analyte.	Y
25	ANALYTE	CHAR	50	Name of the chemical analyte.	Y
26	RESULT	NUMBER		Numeric result of the chemical analyte. This is a numeric field; therefore, it must be a number. Strings like N/A, BMDL, ND, N/D etc. cannot be used to flag concentrations below detection limit and/or non-detects in this field; use DL QUALIFIER field. *Note:* For non-detects, leave null.	Y
27	ERROR	NUMBER		Error factor for the chemical analysis.	N
28	UNITS	CHAR	10	Units of measure associated with the chemical analysis.	Y
29	DILUTION	NUMBER		Dilution factor associated with the chemical analysis.	Y
30	DETECTLIMIT	NUMBER		Detection limit associated with the chemical analysis.	Y
31	DLQUALIFIER	CHAR	15	Detection limit or report qualifier associated with the analysis.	Y
32	LABQUALIFER	CHAR	10	Lab qualifier associated with the chemical analysis.	Y
33	SURROGATE	CHAR	1	Indication whether or not the result represents a surrogates recovery analysis. Expected values include: • N (No) • Y (Yes)	Y
34	COMMENTS	CHAR	240	Any comments associated with the chemical analysis.	N

APPENDIX C

Health and Safety Plan (HASP)

APPENDIX C

Health and Safety Plan (HASP)

FIGURE

1.0 GENERAL INFORMATION

Site Name: 305 Spicer Avenue

Site Address: 305 Spicer Avenue
South Plainfield, New Jersey

Site Contact: Frank Riccardi

Site Background:

The Site is a residential lot of approximately 10,000 square feet located in South Plainfield Township, Middlesex County, New Jersey. The Site is located on the north side of Spicer Avenue adjacent to the Hamilton Industrial Park, a facility of approximately 25 acres at which Comell-Dubilier Electronics (CDE) operated from 1936 to 1962. It is alleged that during this period of operation, CDE discarded transformer oils contaminated with polychlorinated biphenyls (PCBs) directly onto soils at the facility. Former employees have reportedly claimed that transformers were buried behind the facility during the same tune period.

Soil sampling conducted at the Hamilton Industrial Park have indicated the presence of PCBs. Soil samples collected from this facility were also found to contain PCBs. ENVIRON has been retained by CDE to assist with additional soil sampling at the Site as required in partial fulfillment of the administrative order of consent (AOC, II-CERCLA-98-0115) between CDE, D.S.C. of Newark Enterprises, Inc. and USEPA.

Work Objectives:

ENVIRON Corporation (ENVIRON) will be conducting surface soil sampling activities at the site.

ENVIRON Employees On-Site:

Alice Chou
Joe Hidalgo

2.0 PHYSICAL, CHEMICAL AND BIOLOGICAL HAZARDS

Physical hazards at the site include slip, trip and fall hazards and heat stress hazards. All persomel shall follow general safety precautions, keeping visual contact with and noting the condition of the ground aromd them at all times, while walking slowly, to prevent slips, trips, and falls. When the temperature rises above 75°F, persomel shall monitor for signs and symptoms of heat stress and properly manage any heat stress emergencies which may arise, as described in Section 3.0.

Chemical hazards on-site include soils potentially contaminated with PCBs. Exposure to PCBs may occur via incidental ingestion, and dermal contact pathways only. Inhalation is not expected to be a significant pathway due to the short duration of the sampling activities and PCB's low volatility. Personnel shall refrain from eating, drinking, or smoking while performing sampling tasks to limit incidental ingestion. Personnel shall follow decontamination protocols after sampling and prior to engaging in those activities. Persomel shall perform all sampling tasks wearing the appropriate personal protective equipment (PPE), as described in Section 4.1, to minimize exposure via dermal contact.

Biological hazards on-site include the presence of ticks. Personnel shall perform a visual inspection of their body prior to exiting the site to insure that no ticks appear on their body.

3.0 HAZARD EVALUATION

Heat stress injuries occur when the body's physiological processes fail to maintain a normal body temperature under excessive heat conditions, often combined with physical activity. The physical reactions that may occur range from mild (such as fatigue, irritability, anxiety, and decreased concentration, dexterity, and movement) to fatal. On-site personnel must be aware of the signs, symptoms, and hazards of various heat stress injuries and monitor for them periodically when conditions dictate it. They must also know the proper treatment for each type of injury. Types of heat stress injuries and appropriate first aid procedures include the following:

Heat Cramps - Loss of salt from the body, usually due to profuse sweating, can cause painful cramps and muscle spasms, particularly in the hands, feet, legs and abdomen.

Provide emergency care for heat cramps by removing the patient to a cool place, giving the patient sips of liquids such as "Gatorade" or its equivalent to replace loss of electrolytes, and applying manual pressure to massage the cramped muscle.

Heat Exhaustion - Pooling of blood in dilated skin vessels, due to blood circulation transferring heat away from the interior to the outer skin, can cause inadequate return of blood to the heart, evenmally leading to physical collapse. Signs and symptoms include a weak, rapid pulse; shallow, rapid breathing; pale, cool, and moist skin; profuse perspiration; generalized weakness; dizziness; nausea or vomiting; and fainting or unconsciousness.

Provide emergency care for heat exhaustion by removing the patient to a cool place and removing as much clothing as possible. Seek medical attention, if necessary.

Heat Stroke - Failure of the body's temperature regulating mechanism can result in convulsions, unconsciousness, coma, and even death. This is a tme life-threatening emergency, characterized by a strong, rapid pulse; red, hot, dry, skin; deep breaths becoming shallower and possibly even absent; reduced perspiration; dizziness or confusion; nausea or vomiting; and umconsciousness or coma.

Provide emergency care for heat stroke by removing the patient to a cool place and removing as much clothing as possible. Reduce the body temperature promptly by dousing with water or wrapping in a cool, wet sheet. If available, place cold packs under the arms, around the neck, and at the ankles. Keep an open airway. Seek medical attention immediately.

Exposure to PCBs may cause eye irritation, chloracne, liver damage, reproductivity effects, and potential carcinogenic effects. First aid procedures for PCB exposure are listed below:

Ingestion: Immediately seek medical attention.

Eye contact: Immediately flush eyes with large amounts of water; seek medical attention.

Skin contact: Immediately wash contacted area with soap and water; seek medical attention, if necessary.

4.0 SITE SAFETY WORK PLAN

4.1 Personal Protective Equipment

All sampling work will be conducted by personnel wearing modified Level D personal protective equipment (PPE), which shall consist of:

- steel-toed safety work boots,
- latex boot liners,
- disposable neoprene gloves, and
- hard hat.

4.2 Decontamination Procedures

All sampling equipment will be decontaminated prior to leaving the site using the following procedure:

- Place dirty equipment on plastic ground sheet or in similar containment area;
- Wash thoroughly with a laboratory detergent (Alconox or equivalent) to remove any particulate matter and/or surface films using bristle brush, as needed (sampling equipment with oil or other hard to remove materials may require rinsing with isopropanol prior to washing with the detergent solution);
- Rinse thoroughly with clean potable water;
- Rinse thoroughly with clean deionized water;
- Air-dry; and
- Wrap decontaminated equipment in aluminum foil (shiny side out) for storage and transportation.

Personnel shall then dispose of all wastes properly. Personnel shall then remove all PPE and dispose of properly before exiting the sampling area.

5.0 EMERGENCY TELEPHONE NUMBERS

Fire:	South Plainfield Fire Department	911
Police:	South Plainfield Police Department	911
Ambulance:	South Plainfield Rescue Squad	911
Hospital:	Muhlenburg Hospital	908-668-2000
	Emergency Department	908-668-2200
	Chemical Trauma Capabilities?	Yes

Directions to Muhlenburg Hospital (Hospital Route Map included in Figure C-1):

Take a right from the residence onto Spicer Avenue. Proceed to the corner and take a right onto Hamilton Avenue. Proceed to the first light and make a right onto Maple Avenue. Proceed on Maple Avenue to the next light and make a left onto Park Avenue. The hospital is approximately 1 mile down on the right. For the emergeacy entrance, proceed to the end of the block and mm right onto Randolph Avenue.

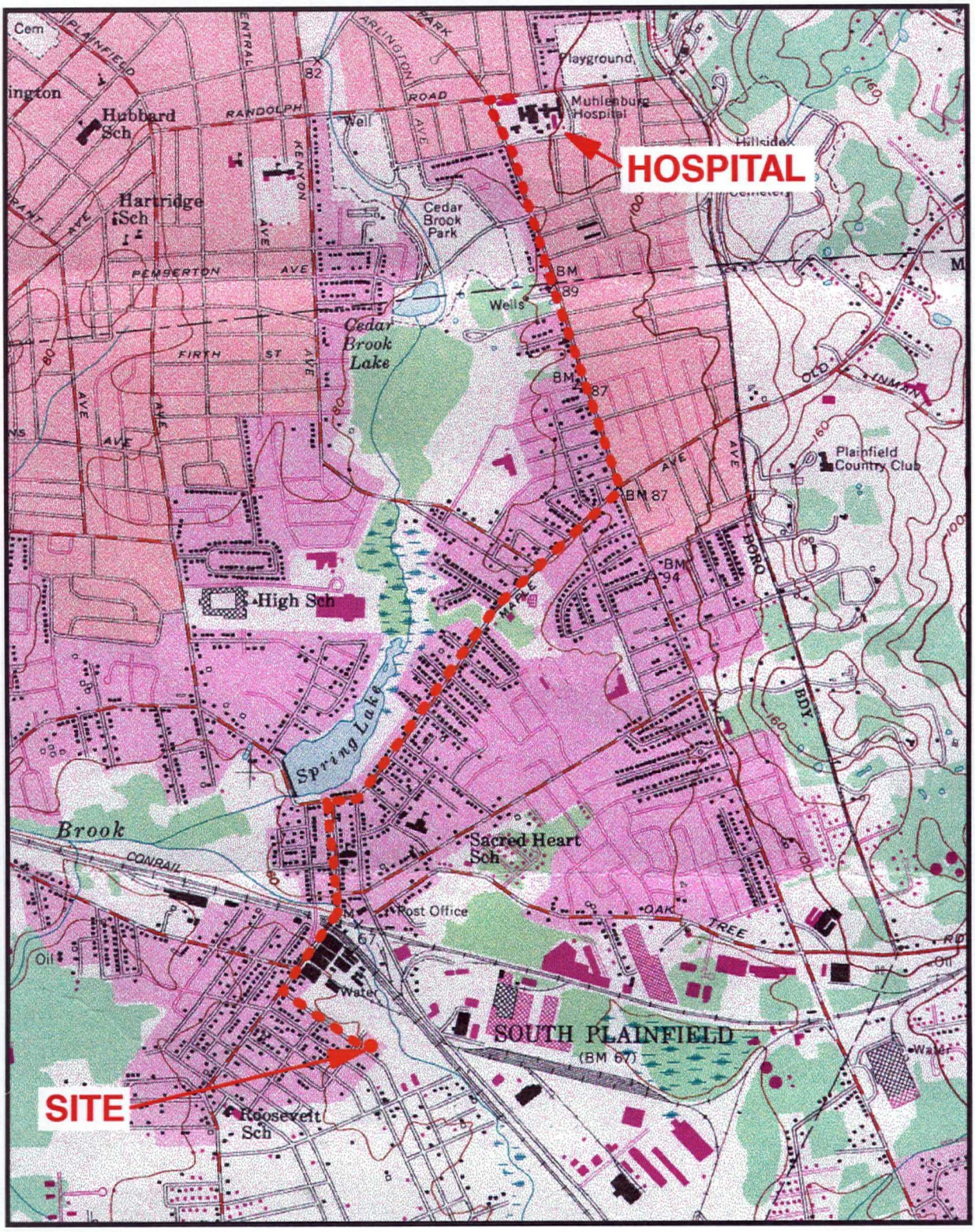
Poison Control Center (NJ):	800-764-7661
Poison Control Center (national):	800-942-5969
Centers for Disease Control/ATSDR (day):	404-329-3311
Centers for Disease Control/ATSDR (night):	404-329-3644
TSCA Hotline:	800-424-9065
Chemtrec:	800-424-9300

Prepared by: Diana E Torrente Date: 9/2/98
HASP Author

Approved by: Robert C. Adams Date: 9/2/98
Health and Safety Coordinator

Approved by: J. Mark Ext Date: 9/2/98
Project Manager

Approved by: M P Date: 9/2/98
Project Principal



0 2000 4000

Scale In Feet

SOURCE: USGS 7.5 MINUTE SERIES PLAINFIELD, N.J. QUADRANGLE, 1955, PHOTOREVISED 1981.

ENVIRON

DRAFTED BY: TJF | DATE: 8/3/98

ROUTE TO HOSPITAL

305 SPICER AVENUE
SOUTH PLAINFIELD, NEW JERSEY

FIGURE
C-1

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